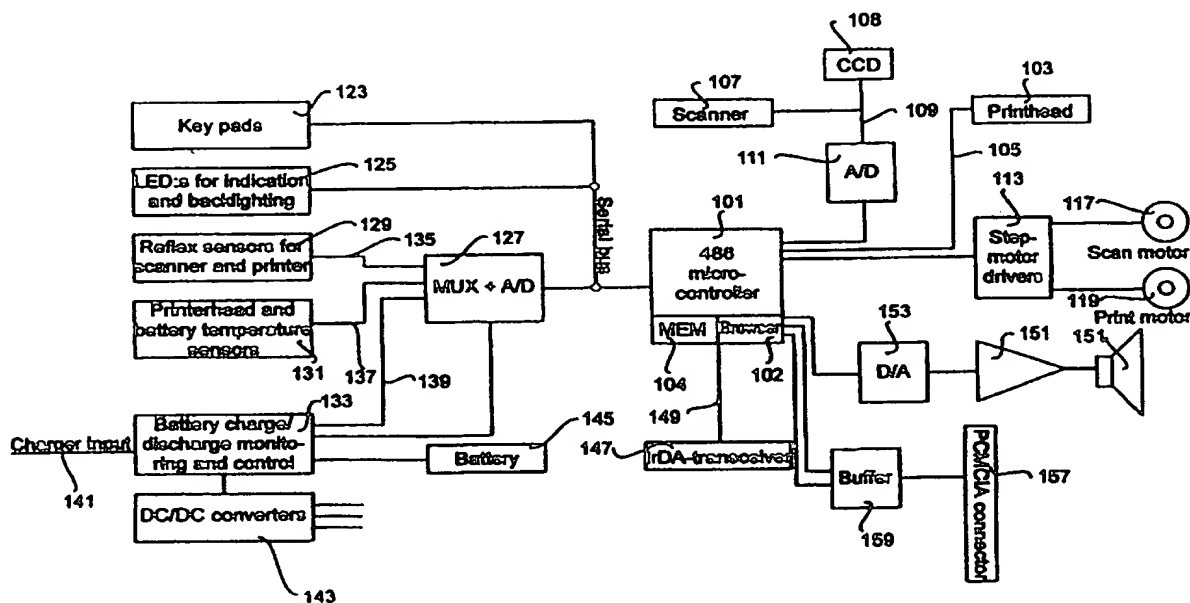




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(54) Title: A PRINTING AND SCANNING DEVICE FOR INTERNET AND FACSIMILE CELLULAR SERVICES



## (57) Abstract

A printing and scanning device to be used for communication via a telephone or data network, in particular a cellular network, comprising in one unit a printer (103), a scanner (107), a keypad (123) and a microprocessor (101). The printer prints all information demanded by a user which in turn only uses a small keypad as input means. The device can interact with a cellular telephone, whereby a number of different communication services can be utilised, such as transmission and reception of facsimiles, e-mails, browsing, downloading and printout of any information available at a global computer network such as the WWW, and setting up of one's own server by scanning a document and storing it in a memory (104).

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## A PRINTING AND SCANNING DEVICE FOR INTERNET AND FACSIMILE CELLULAR SERVICES

### TECHNICAL FIELD

The present invention relates to a mobile printing and scanning device. The device is used for receiving and transmitting information via a cellular network and for scanning information from a paper and printing information on a paper. The device can also be used for providing images scanned by an electronic image generator.

### PRIOR ART AND BACKGROUND OF THE INVENTION

In recent years there has been a strong increase in the demand for new services using the cellular telephone networks being built, and which have expanded enormously. Such demands includes the possibility of more advanced hard-copying services.

The services today include the possibility of transmitting and receiving data in a mobile personal computer via a cellular network. The personal computer can then also be equipped with a printer, integrated with the computer or separate therefrom. Other hard-copying services commercially available is a mobile hard-copy facsimile apparatus sold under the name "FX1", which is developed and manufactured by System Innovation. The facsimile apparatus is designed for transmission via a cellular telephone network.

Thus, in the case where the primary desire is to obtain different kinds of communications via a cellular network, the solutions available today are not very well suited. For example, a laptop computer combined with a printer and scanners is today quite expensive. Furthermore, such a combination is not very practical to bring along due to its weight and size. Also, the standby time for such a combination is very limited due to the power consumption involved.

### SUMMARY

It is an object of the present invention to provide a printing and / or scanning device, which can communicate and exchange information with other units via a cellular network, and which can provide a number of different advanced hardcopying services at a low cost.

It is a further object of the present invention to provide a device, which overcomes all the problems outlined above when a user wants to communicate via a cellular network.

It is yet a further object of the invention to provide a small and low-cost printing device which can access and search a global computer network.

These objects and others are obtained with a printing device comprising in one single unit a printer and / or a scanner. The device also comprises a microprocessor for handling the information flow inside the device, and a searching means, such as a browser, whereby the printing device can access and connect to an address in a global computer network. The device can then be used for communication via a cellular network with other units only using as man-machine interface the printer and a keypad.

Possibly also a loudspeaker and light indication signals can be used for providing a user with information. However, no LCD display is required, which is a major advantage since this both saves space and costs.

The use of the device according to the invention provides a large number of advantages in comparison to existing solutions according to the prior art.

Thus, by using a device as described herein, a large number of communication services can be provided and utilised. Such services includes: downloading and printout of any information available in a global computer network such as the world wide web (WWW), reception and transmission of facsimiles, printout of electronic mail received in the user's mailbox, and setting up one's own server which then can be accessed by a third party via a cellular network, etc.

#### BRIEF DESCRIPTION OF THE FIGURES

The present invention will now be described in more detail by way of non-limiting embodiments and with reference to the accompanying drawings, in which:

- Fig. 1 is a schematic block diagram of a printing and scanning device.
- Fig. 2 shows the exterior of a preferred embodiment of the device in fig. 1 interacting with a PC and a cellular telephone.

## DESCRIPTION OF PREFERRED EMBODIMENTS

In fig. 1, a schematic block diagram of a printing device is shown. Thus, the figure shows a control unit or microprocessor 101, in this example the processor is a microprocessor compatible with a conventional 486-processor manufactured by Intel Corporation. The processor 101 is connected to a printing head 103 used for all printing operations initiated by the processor 101, via a line 105. The microprocessor 101 is also connected to a scanner 107, which is used for scanning any kind of document to be transmitted as a facsimile or stored in a memory 104 associated with the processor 101, via a line 109 and a A/D converter 111.

Furthermore, the processor 101 also controls step motors used for the printer 103 and scanner 107. This is performed by controlling the step motor drives 113 via the line 115. The step motor drives 113 then drive the scanner motor and printer motor 117 and 119, respectively.

Further, the microprocessor 101 is connected to a serial bus 121. The serial bus is also connected to a keypad 123, which is used for entering commands to the microprocessor 101, light emitting diodes (LEDs) 125, which can be used by the device for signalling different states of operation to a user, and a combined multiplexer and A/D converter 127. The combined multiplexer and A/D converter is connected to reflex sensors 129 for the scanner and printer, respectively, to printer head and battery temperature sensors 131, and to a battery charge/discharge monitor and control unit 133, via lines 135, 137 and 139, respectively.

The unit 133 is used for monitoring the batteries and in response to the monitor output signal obtained, for outputting a control signal, which is used for control of the printing speed of the printer 103. Thus, by adapting the printing speed to the battery capacity available, the printout quality can be maintained as the batteries are discharged or exposed for changes in temperature, which in turn will affect the output capacity from the battery.

The maintaining of quality is obtained by controlling the number of dots being printed at the same time in such a manner that the state of charge of the battery does not affect the printout quality. Also, by monitoring the battery

charge, a light or sound signal is issued, or a message printout can be initiated when a recharge of the batteries becomes necessary.

To the unit 133 a charger input 141, a DC/DC converter unit 143 and a battery 145 are connected.

Moreover, the microprocessor 101 is connected to an IrDA transceiver 147 via a line 149, to a loud speaker 151 via a D/A converter 153 and an amplifier 155, and to a PCMCIA connector or PC-card slot 157 via a bi-directional buffer 159.

The mobile printing device as shown in fig. 1 can perform a multitude of different communication tasks. Thus, via the interface provided by the IrDA transceiver, information can be received from or transmitted to another unit such as a cellular telephone or a personal computer (PC) without having to use any connection cables. In the case when a IrDA connection is not possible or practised, a PC-card can instead be used. The PC-card is inserted in the PCMCIA connector or PC-card slot 157, and allows for communication via traditional telephone and LAN networks, such as for example the public switched telephone network (PSTN).

Thus, by entering a code via the key pad 123 of the device corresponding to a specific address in a global computer network, such as the World Wide Web (WWW), which address then preferably is printed on paper by the printer head 103, and pressing an enter key, the information available at that address or location in the WWW is transmitted to the printer device via a cellular telephone and a cellular network, and printed out on paper. For this purpose, i.e. searching a global computer network, the printing device is equipped with a browser 102 located inside the controller 101.

In a similar manner an e-mailbox can be contacted and the electronic mail received by the mailbox can be transmitted to the printer device and printed directly on paper.

When the printed page is a page written in HTML code or a similar code wherein links to other addresses in the WWW are indicated and included in the page, each such link in that particular page is given an individual code or

number by the browser 102. The code or number is then preferably printed both in association to the link on the page and/or as a footnote at the bottom of the page printed by the printer, where also the complete address can be printed.

If a user then wants to connect to any of the links indicated on the printed page, he/she only needs to enter the code or number associated with that particular link in order for the browser 102 inside the printing device to look up and connect to that address.

In the case when the links on the printed page are associated with a clickable image, the numerical references to the links can be generated in two different manners. As a first alternative each part of the clickable image can be associated with a particular code which is printed next to that part of the clickable image, i.e. basically the same procedure as described above, and the corresponding address is printed as a footnote at the bottom of the page. In another embodiment, a coordinate system is associated with the clickable image, and by entering the coordinates corresponding to a link associated with a particular part of the clickable image, that link is chosen and the browser connects to the address given by that link.

Furthermore, the printing device can be used as a facsimile apparatus. In such a case, the paper(s) which are desired to be transmitted are scanned by the scanner 107 and the analogue signal output by the scanner is converted to a digital bitstream in the A/D converter 111. The digital signal is then preferably transmitted via the IrDA transceiver 147 and a cellular network via a cellular telephone interacting with the device via the IrDA interface 147. The device is of course also capable of receiving facsimiles via the IrDA interface 147. The received facsimiles are printed out directly on paper by the printer 103.

Also, the printing device can be used as a combined mobile printer/scanner, interacting with a PC. The printer device can then provide all conventional services provided by a conventional printer as well as by a conventional scanner.

In another preferred embodiment the micro processor 101 is also provided with a memory 104 large enough for storing a number of scanned pages scanned by the scanner or captured by the CCD or digital camera. In such an embodiment the device can also act as a server to which other units can connect and read and/or download the information stored in the memory. The scanned or captured images can then be stored as HTML pages which can be accessed via the WWW.

Also in yet another preferred embodiment, the scanner 107 is exchanged or supplemented with an electronic image generator, such as a charge-coupled device 108 (CCD) or a digital camera, whereby the image scanned by the scanner does not need to be printed on paper, but instead can be an image captured by the CCD 108.

In order to provide a user with more information indication LEDs 125 can as mentioned above be lit by the processor 101. The printer device can also output sound via the loud speaker 151.

In fig. 2, the exterior of a device housing in one single unit all the components and parts described above in conjunction with fig. 1, is shown at 201. The figure also shows a cellular telephone 203 and a personal computer (PC) 205. The device 201 can communicate with the cellular telephone 201 and the PC 205, via the IrDA interfaces shown at 207, 209 and 211. The information received by the device is printed on paper by the printer 213, and information can be transmitted or collected by a user by using the keypad 215 and the scanner 217 in a manner as described above in conjunction with fig. 1.

Hence, a device as described herein, provides a user with a very efficient and powerful tool when he or she has to communicate. The device as described is very small and has a low weight. The manufacturing cost will be very low compared to other solutions providing similar services, such as a PC having a printer and scanner connected thereto. This is primarily due to that no graphical interface is required.

Furthermore, it is capable of unattended receipt of messages without any power waste. The limiting factor in terms of standby time being determined by



the standby time for the mobile phone used for connecting to the cellular network. The device is also mechanically rugged and robust, and involves few moving parts and external connections. It is therefore suitable for operations in a troublesome environment, such as low temperatures and high vibrations.

Finally, the device has a simple user interface only consisting of, in the simplest embodiment, a keypad and a paper printout. Also, the device has a low power consumption resulting in long recharge intervals.

**CLAIMS**

1. A printer comprising a single housing, **characterised by**
  - means for searching of and connecting to a multitude of addresses in a global computer network via a data or telephone network, and
  - means for receiving and printing out directly on paper the information provided at a contacted address.
2. A printer according to claim 1, **characterised in** that the means for searching the computer network is a browser.
3. A printer according to any of claims 1 - 2, **characterised in** that the data or telephone network is a cellular network.
4. A printer according to any of claims 1 - 3, **characterised by**
  - means for scanning and storing information fed to the device.
5. A printer according to any of claims 1 - 4, **characterised by**
  - means for contacting an e-mailbox.
6. A printer according to any of claims 1 - 5, **characterised by**
  - means for assigning a number or a code to all links associated with a page printed by the printer, and/or
  - means for printing footnotes comprising a code or a number and an address in the global computer network.
7. A printer/scanner device arranged to be connected to a data or telephone network, **characterised by**
  - a controlling unit connected to a scanner and a printer,
  - a keypad connected to said controller unit for entering commands to the controller unit, and
  - a browser by means of which a global computer network can be searched.
8. A device according to claim 7, **characterised by**
  - an IrDA transceiver connected to the controller unit for mobile communication with a cellular telephone.

9. A device according to any of claims 7 - 8, **characterised by**  
- a memory in which images or text scanned by the scanner can be stored  
and which memory can be accessed via a data or telephone network.
10. A device according to any of claims 7 - 9, **characterised by**  
- a PC-card slot, whereby the device can be connected to a public switched  
telephone network (PSTN).

1/2

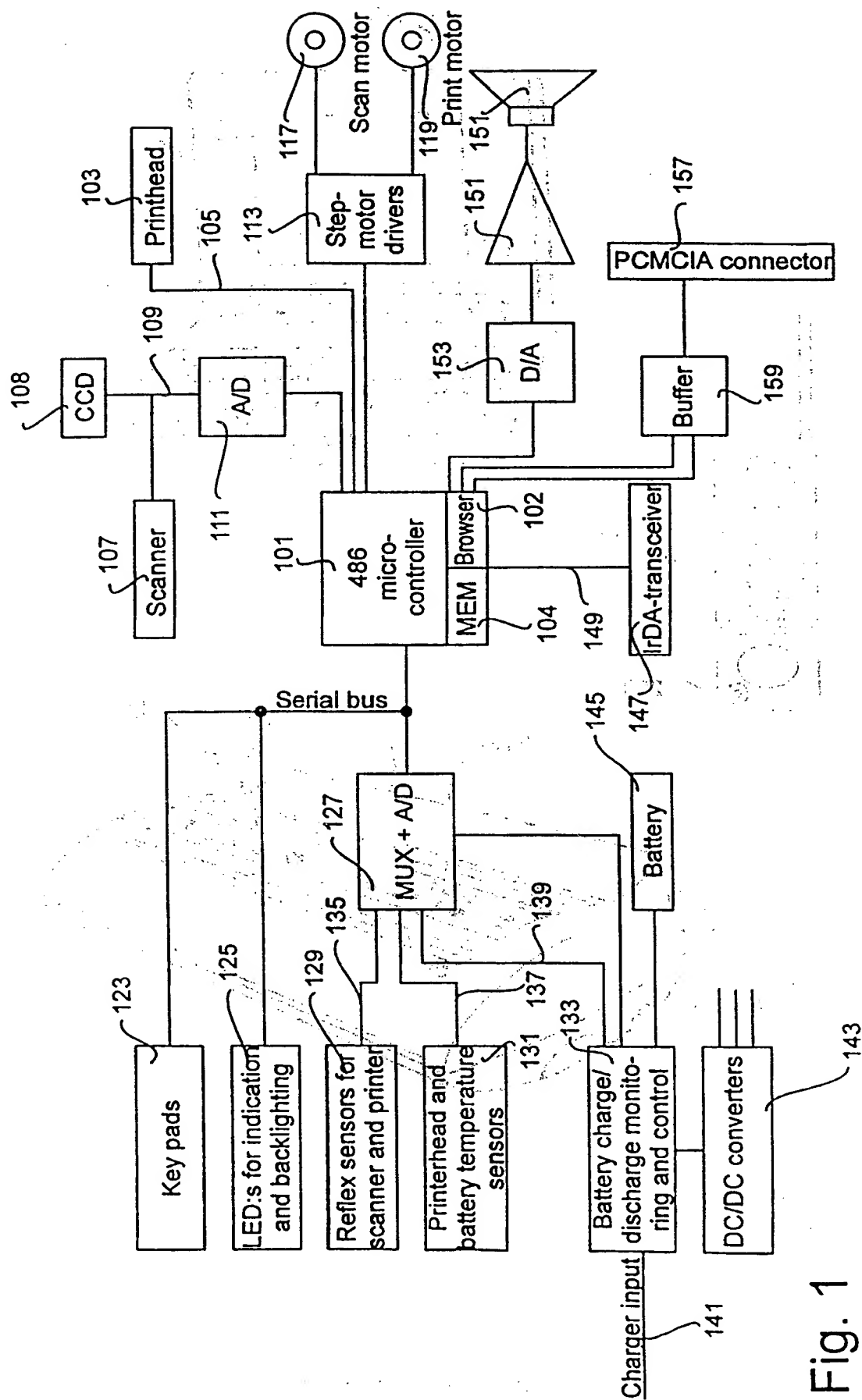


Fig. 1

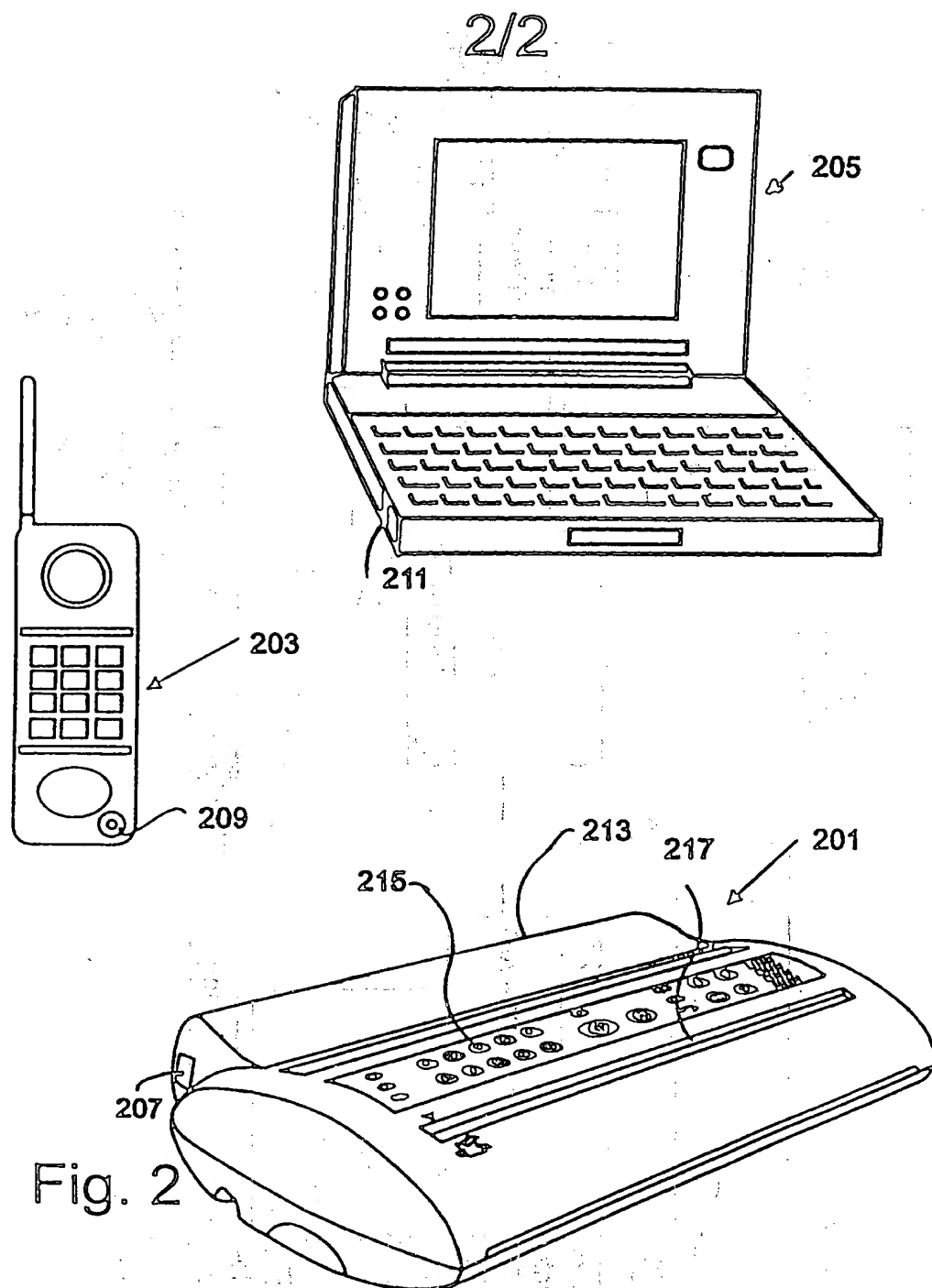


Fig. 2

1. The first part of the document is a list of the names of the persons who were present at the meeting. The names are listed in alphabetical order.

2. The second part of the document is a list of the names of the persons who were present at the meeting. The names are listed in alphabetical order.

3. The third part of the document is a list of the names of the persons who were present at the meeting. The names are listed in alphabetical order.

4. The fourth part of the document is a list of the names of the persons who were present at the meeting. The names are listed in alphabetical order.

5. The fifth part of the document is a list of the names of the persons who were present at the meeting. The names are listed in alphabetical order.

6. The sixth part of the document is a list of the names of the persons who were present at the meeting. The names are listed in alphabetical order.

7. The seventh part of the document is a list of the names of the persons who were present at the meeting. The names are listed in alphabetical order.

8. The eighth part of the document is a list of the names of the persons who were present at the meeting. The names are listed in alphabetical order.

9. The ninth part of the document is a list of the names of the persons who were present at the meeting. The names are listed in alphabetical order.

10. The tenth part of the document is a list of the names of the persons who were present at the meeting. The names are listed in alphabetical order.

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